**Homework 3**

**Due: March 23rd**

1. Name five fermentable sugars that could be found in wort, prior to fermentation
2. What is the difference between amylopectin and amylose?
3. Name a product formed by Alpha Amylase.
4. What grist ratio was used for a mash if a mash temperature of 70 Celsius was achieved using strike water at 74.8 Celsius and the grain temperature was initially 34.9 Celsius? Provide the grist ratio units.
5. Give 4 possible purposes/effects of boiling wort.
6. What is the major component that contributes to the bitterness in hops?
7. Name the three major classes of hop essential oils.
8. You have the following:

15 BBL of Sweet Wort

SG: 1.050

You wish to do a 60 minute boil and hit a target IBU of 20. Your boiling kettle has 10%/hour evaporative losses (it is really inefficient). The hop bill you will be using is as follows:

Hop A @ 60 minutes – Alpha Acid Content: 13.0% - Utilization 30% - Unknown ounces

Hop B @ 30 minutes – Alpha Acid Content: 5.3% - Utilization 20% - 20 ounces

Hop C @ 10 minutes – Alpha Acid Content: 2.5% - Utilization 7% - 10 ounces

Calculate:

1. The amount of wort left over after boiling (in gallons @ 60 Fahrenheit)
2. The resulting SG (neglect the effect of hops on SG)
3. The amount of ounces of Hop A you will need to hit the target IBU.
4. The IBU Contribution of each of the Hops

Show all work and assumptions (densities, etc) for credit.